Santa Susana Field Laboratory
Monthly Status Report
February 2019

This monthly update is to inform the community about Santa Susana Field Laboratory (SSFL) investigation and cleanup activities that occurred in February 2019 as well as those that are planned for coming months under the California Department of Toxic Substances Control's (DTSC) oversight. A project overview for The Boeing Company (Boeing), United States Department of Energy (DOE) and National Aeronautics and Space Administration (NASA) SSFL areas is included at the end of this report. Documents referenced in this monthly status report that have been reviewed and commented on by DTSC are hyperlinked for easy access. Documents that are currently under DTSC's review will be made available once DTSC's review comments have been issued.

1 SSFL Activities Completed During FEBRUARY 2019

DTSC

California Environmental Quality Act (CEQA)

DTSC's draft Program Environmental Impact Report (draft PEIR) for the SSFL project was issued for public review on September 7, 2017. The 90-day public comment period ended on December 14, 2017. DTSC is currently compiling and reviewing comments that were submitted during the comment period as well as verbal comments received at public hearings. The responses to comments will be included in the final PEIR.

Program Management Plan

DTSC's draft Program Management Plan (draft PMP) for the SSFL project was issued for public review with the draft PEIR on September 7, 2017. Comments on the draft PMP are being evaluated by DTSC, and the draft document will be finalized as part of the circulation of the final PEIR.

Site Wide Air Monitoring

Air monitoring is being conducted to evaluate baseline concentrations of airborne dust, volatile organic compounds, and radionuclides at SSFL prior to commencing cleanup activities. This data will be used to evaluate what, if any, impacts to air quality are caused by cleanup activities. The baseline monitoring program is described in the Final Baseline Air Monitoring Work Plan Data collection for the baseline air monitoring program began on April 15, 2018. Quarterly Reports are available at the following link.

WOOLSEY FIRE RESPONSE ACTIVITIES

On November 8 and 9, 2018, the Woolsey Fire burned through a portion of SSFL. DTSC evaluated the impact of the fire based on reports from fire responders, visual inspection of the site, measurements from hand-held instruments, and laboratory analysis of field samples collected on-site and in surrounding communities. DTSC also requested and received support from a Response Team of federal, state, and local agencies with expertise in evaluating possible releases of radiation and hazardous materials, and the potential impacts from fires.

On December 18, 2018, DTSC released the "DTSC Interim Summary Report of Woolsey Fire, Impacts at SSFL & Surrounding Communities Sampling Results". The interim report summarizes work done between November 8 and 30, 2018 to address concerns about the impact of the Woolsey Fire on SSFL and to assess the possibility that the fire caused radionuclides and hazardous chemical waste on the site to migrate into surrounding communities.

Over the course of three weeks, the agencies performed field inspections and computer simulations, took measurements and physical samples, conducted monitoring and reviewed available data from existing monitoring stations on the SSFL site and in nearby communities. Taken together, the observations and data from these investigations provide multiple lines of evidence that no radiation or hazardous materials from SSFL were detected in communities following the Woolsey fire.

NASA

SOILS:
DTSC is completing review of NASA's revised *Soil Data Summary Report*, submitted to DTSC on February 22, 2017. This document is a revision to a draft document (dated May 2015) reviewed and commented on by DTSC in March 2016. The report summarizes the results of soil samples collected to define the extent of chemical contamination at NASA-administered sites at SSFL.

GROUNDWATER:

On February 27, 2019, NASA provided DTSC with a revised Groundwater Interim Measures Well Installation Work Plan for a replacement Groundwater Interim Measures (GWIM) well ND-138.

On October 15, 2018, DTSC issued a comment letter on the May 2018 NASA draft RCRA Facility Investigation (RFI) report, which summarizes the results of NASA's 2013-2016 groundwater source investigations conducted at four sites (the Former Liquid Oxygen (LOX) Plant Area, the Expended Launch Vehicle (ELV)-Building 204 Area, and the former Alfa-Bravo and Coca-Delta Test Stand Areas). DTSC previously provided NASA with the following comment letters on the report: Lox Plant Area, Building 204/ELV Area, and Alfa Bravo Area. NASA is anticipating revising and submitting updated versions of these documents based on DTSC comments.

DTSC is reviewing the NASA groundwater Draft Corrective Measures Study (CMS), dated August 2018. This document presents NASA's draft evaluation of the cleanup technologies and alternatives proposed for the remediation of contaminated groundwater and groundwater source zones at the NASA-administered portion of SSFL.

DEMOLITION:
NASA demolition activities continued in February with the removal of debris from the Coca, Bravo, and LOX sites. The current NASA demolition program is nearing completion, with the conclusion of the program anticipated to occur before Summer 2019. Demolition activities at SSFL are conducted under the clearance permit requirements of Ventura County.

PERMITTING:

In June 2016, NASA submitted a draft post-closure permit renewal application for the Area II Surface Impoundments. DTSC has reviewed the documents for technical completeness. Changes to post-closure permit requirements under California Code of Regulations Title 22, Article 6 were finalized and implemented in January 2019. The effect of changes to post-closure permit requirements on the NASA post closure sites is being evaluated by DTSC.

The post-closure requirements for the Area II Surface Impoundments are regulated by DTSC under RCRA laws and regulations because these impoundments are former hazardous waste facilities. The required cleanup levels for the impacted soil will continue to be dictated by the 2010 Administrative Order on Consent for Remedial Action (AOC).

DOE

SOILS:

On December 29, 2016, DOE submitted a Draft Chemical Data Summary Report. The report summarizes the results of soil samples collected to define the extent of chemical contamination in soil in Area IV and the Northern Buffer Zone at SSFL. On April 24, 2018, DTSC provided comments based on review of this report.

In 2012, US Environmental Protection Agency (US EPA), in coordination with DTSC and DOE, completed sampling efforts to define the nature and extent of Area IV radiologic contamination.

DOE conducted soil treatability studies to evaluate onsite soil treatment technologies that could potentially reduce the volume of contaminated soil to be excavated and transported from Area IV. The treatability studies addressed soil partitioning, mercury valence state in soil, bioremediation, phytoremediation, and natural attenuation, as well as residual fuel hydrocarbon characterization methods. The soil treatability studies study plans, evaluation reports and Summary Report have been uploaded to the DTSC-SSFL DOE Soil Treatability Studies web page.

GROUNDWATER:

DOE has completed the majority of its field investigation of groundwater contamination at DOE sites at SSFL in support of the RFI's objective of defining the nature and extent of groundwater impacts. The findings from the RFI groundwater investigation are presented in "Preliminary Draft RCRA Facility Groundwater Investigation Report (GW RFI Report) Area IV, Santa Susana Field Laboratory, Ventura County, California", dated June 16, 2017. On August 30, 2018, DOE submitted an updated and revised version of the RCRA Facility Groundwater Remedial Investigation Report, Area IV which is intended for

partial completion of the site-wide Groundwater RFI that will be combined with efforts being implemented by Boeing and NASA to address deficiencies previously identified by DTSC. DTSC has completed review of this document and anticipates issuing the final set of comments to DOE in early 2019. DOE recently submitted its 2018 Annual Report on Groundwater Monitoring for Area IV, dated February 2019, as well as a report summarizing its first quarter 2019 groundwater monitoring data.

In 2018, DOE conducted several focused groundwater field investigations of subsurface conditions at contaminant source areas. Data generated during the focused investigations is utilized for remediation planning. In February 2019, DOE submitted a technical memorandum dated October 24, 2018 summarizing aquifer testing and groundwater sampling results of field activities performed at the Hazardous Materials Storage Area (HMSA) in May 2018. DOE also submitted a technical memorandum dated December 10, 2018 summarizing the installation and sampling of three new wells and the deepening of a fourth well associated with the groundwater investigation of the HMSA. DOE submitted a technical memorandum (revision 1) dated December 6, 2018, summarizing results of the rock core investigation conducted at the Former Sodium Disposal Facility (FSDF). The investigation involved the drilling of eight bedrock coreholes and sampling of the core and groundwater, as part of focused investigation of volatile organic compounds (VOCs) at the FSDF. The main objective of the field work was to gather data to identify near surface fractures containing VOCs that may be contributing to deeper bedrock groundwater contamination. The document's conclusions indicate that results of the investigation support the findings of prior VOC source investigations at FSDF, in that higher concentrations of trichlorethylene (TCE) are present in near-surface (less than 100 feet below ground surface) bedrock fractures. The results also support prior findings regarding the spatial distribution of the TCE source location in the vicinity of well RS-54 and to the north of RS-54. TCE concentrations were found to be lower for samples collected to the west or south of RS-54. DOE submitted a technical memorandum dated August 5, 2018 summarizing results of a soil gas investigation at the FSDF, Building 4009 Leach Field, and Building 4457 at the HMSA. The document states that passive soil gas sampling results showed that highest soil gas volatile organic compound (VOC) concentrations at FSDF are in the vicinity of near-surface well RS-54, and that the well has exhibited the highest VOC concentrations for FSDF. The document also states that passive soil gas sampling results suggest the Building 4009 Leach Field does not appear to be a source for VOCs observed in nearby well RD-91. The document also indicates passive soil gas results showed no detections of site-related VOCs in the HMSA Building 4457 samples.

The 2007 Consent Order for Corrective Action requires submittal of Corrective Measures Study Work Plans that detail the methodology for developing and evaluating potential corrective measures to remedy chemical contamination at SSFL. On September 27, 2018, DOE submitted a Draft Corrective Measures Study (CMS) for DOE's Groundwater Area IV Responsibilities. The draft CMS evaluates and provides rationale for selection of possible groundwater cleanup actions. DTSC is currently reviewing the document.

Starting in November 2017, DOE initiated the extraction of groundwater from well RS-54 as part of the Groundwater Interim Measure (GWIM) at the Area IV Former Sodium Disposal Facility (FSDF). DOE submitted a January 2019 Update on the FSDF GWIM activities. This document is the fourth status report for the FSDF GWIM activities. The objective of the GWIM at the FSDF is to remove contaminant mass to reduce the threat of contamination to Chatsworth Formation groundwater. Well RS-54 is relatively shallow and is within the footprint of the former pond. It extends over 40 feet into bedrock and has exhibited elevated concentrations of trichloroethene in groundwater. It is used to monitor shallow groundwater that is likely derived by rainfall that infiltrated to the subsurface and is impacted by contaminants contained in near-surface bedrock fractures. DOE has indicated that water levels in this well are highly dependent on seasonal rainfall. The well is dry during below average rain years and has measurable levels of water that can be extracted during average rainfall years. Groundwater extraction

from well RS-54has occurred since November 2017 when the water level was 22 feet above the bottom of the well. Since the start of pumping, the water has been pumped down to the level of the pump inside the well 26 times. In March 2018, the pump was replaced with a new pump and placed one-foot lower than the previous pump. Following each pumping event, the lowered water level requires more time to rise and recover, resulting in less water available to remove over time. As of December 2018, the water level in this well is still low. Nearby core hole C-21, drilled in June 2018 to 53 ft. bgs, captured a sufficient amount of shallow fracture-bearing groundwater to allow for previous sampling and purging. From November 2017 through December 2018, approximately 330 gallons of water were pumped from shallow well RS-54, and approximately 55.5 gallons were extracted from corehole C-21. DOE will continue to monitor the water levels of these wells and will sample if a sufficient amount of water recovers. Well development water and purge water generated since July 2018 has been characterized and taken offsite for proper treatment and disposal at a licensed facility.

DOE continues to evaluate the recent pumping and analytical results, and periodically provides progress reports to DTSC regarding ongoing implementation of the GWIM.

BIOLOGICAL ISSUES ASSOCIATED WITH CLEANUP:

Biological issues affect the overall SSFL cleanup project, and studies and permits will need to be conducted prior to starting cleanup. Continued communications between DTSC, agencies and RPs will be necessary to address main issues and develop a path forward for addressing biological issues associated with the proposed cleanup.

PERMITTING:

Safe closure and removal of the structures and buildings is an important step towards completion of the soil investigation and cleanup at DOE's portion of SSFL. On August 13, 2018, DTSC released for public review and comment DOE's Draft Resource Conservation and Recovery Act (RCRA) Closure Plans (Plans) for the Radioactive Materials Handling Facility (RMHF; Buildings 4021, 4022, and 4621 and adjacent outside storage yard) and the Hazardous Waste Management Facility (HWMF; Buildings T029 and T133; Part 1 and Part 2). These plans address closure (or demolition and removal) of remaining structures in Area IV which have either RCRA permit or Interim Status authorization, meaning they are regulated with respect to handling, treatment, storage and disposal of hazardous wastes. The HWMF and RMHF will be demolished using standard construction equipment and demolition techniques, as further described in DOE's "Standard Operating Procedure for Demolition of Facilities in Area IV at the Santa Susana Field Laboratory, Revision C", dated August 2016 (SOP). Any contaminated soil and groundwater remaining after demolition will be addressed under the 2010 AOC and the 2007 Consent Order for Corrective Action, respectively. DTSC issued a public notice and established a public comment period from August 13, 2018 through October 12, 2018. On August 30, 2018 and September 8, 2018, DTSC held two public hearings to receive public comments on the Plans. DTSC will consider and respond to all comments received on the Closure Plans. DTSC anticipates providing a responsive summary with the final Closure Plans. The Closure Plans will not receive final approval until both DTSC's PEIR and DOE's Environmental Impact Statement (EIS) are completed and certified.

DOE's FINAL ENVIRONMENTAL IMPACTS STATEMENT

In a letter dated January 28, 2019, DTSC submitted a letter to DOE regarding the Final Environmental Impact Statement (FEIS), which was released in November 2018. The letter notes that DTSC remains fully committed to holding DOE accountable to the requirements of the 2010 Administrative Order on Consent. The FEIS can be accessed on the DTSC SSFL web site at: https://www.dtsc-ssfl.com/default.asp?V_DOC_ID=959&subID=211&subID2=211.

BOEING

SURFICIAL MEDIA INVESTIGATION:

Boeing is finishing soils investigation work in Area I, Area III, and the southern buffer zone. Boeing's surficial media characterization work is divided into units identified as Boeing RFI Subareas:

- 1A North, 1A Central, 1A South
- 1B North, 1B Southwest, 1B Southeast
- 5/9 North, 5/9 South, and
- Group 10

Boeing is following the Data Quality Objectives (DQOs) process and standard operating procedures for planning and conducting sampling work to complete the characterization of surficial media. The purpose of the current phase of surficial media investigation work is to collect sufficient data to fill data gaps that were identified in the 2007 and 2008 Group RFI Reports. All Boeing sites are in the data evaluation and reporting work phases.

- ***Subarea 5/9 South*** - Systems Testing Lab (STL-IV), Compound A, Sewage Treatment Plant (STP)-3, and Environmental Effects Laboratory (EEL), and areas not associated with RFI sites in Subarea 5/9 South
  - Boeing submitted responses to comments and revised RFI Data Summary Reports for Subarea 5/9 South on April 27, 2017.
  - DTSC sent comments to Boeing on April 25, 2018 and received responses to the comments on May 24, 2018. On June 12, 2018 DTSC received supplemental information associated with the responses. DTSC reviewed the responses to comments and supplemental information and responded to the comments on July 11, 2018. DTSC and Boeing have been discussing vadose zone to groundwater source area issues. On September 11, 2018 Boeing submitted a memo regarding STL-IV Supplemental Vadose Zone to Groundwater Source Area Information. DTSC provided comments to Boeing on October 29, 2018.
- ***Subarea 1A Central*** - Building 359, Advanced Propulsion Test Facility (APTF), and Happy Valley North and areas not associated with RFI sites in Subarea 1A Central
  - Boeing submitted responses to comments and revised RFI Data Summary Reports for Subarea 1A Central on May 24, 2017. DTSC sent comments to Boeing on June 20, 2018.
- ***Subarea 10*** (Southern Buffer Zone)
  - Boeing submitted the RFI Data Summary Report for Subarea 10 on June 19, 2017.
  - DTSC is reviewing the report.
- ***Subarea 5/9 North*** - Silvernale, Engineering Chemistry Laboratory (ECL), and areas not associated with RFI sites in Subarea 5/9 North
  - Boeing submitted the RFI Data Summary Report for 5/9 North on July 26, 2017.
  - DTSC is reviewing the report.

- ***Subarea 1A South*** - Canyon, Happy Valley South, Laser Engineering Testing Facility (LETF)/CTL-I, and areas not associated with RFI sites in Subarea 1A South
  - Boeing submitted the RFI Data Summary Report for 1A South on August 22, 2017.
  - DTSC is reviewing the report.
- ***Subarea 1B Southeast*** – Chemical Test Lab (CTL)-III, Perimeter Pond, and areas not associated with RFI sites in Subarea 1B Southeast.
  - Boeing submitted the RFI Data Summary Report for 1B Southeast on September 29, 2017.
  - DTSC is reviewing the report.
- ***Subarea 1B North*** - Bowl, R-1 Pond, and areas not associated with RFI sites in Subarea 1B North
  - Boeing submitted the RFI Data Summary Report for 1B North on November 19, 2017.
  - DTSC is reviewing the report.
- ***Subarea 1A North*** - B-1, Instrument & Equipment Laboratory (IEL), Area 1 Landfill, and areas not associated with RFI sites in Subarea 1A North
  - Boeing submitted the RFI Data Summary Report for 1A North on December 18, 2017.
  - DTSC is reviewing the report.
  - Former Shooting Range
    - The Former Shooting Range is not part of Subarea 1A North but the site information is included here as the Former Shooting Range is located on the Mountains Recreation Conservancy Authority, Sage Ranch property which is adjacent to Subarea 1A North and some soil data overlap between the Former Shooting Range area and Subarea 1A North.
    - The work is being conducted under an approved work plan and addendum.
    - Field work to investigate soils to define the extent of lead shot and clay pigeons as well as characterize the soil for lead, arsenic, antimony, and polynuclear aromatic hydrocarbon concentrations began in late September 2016 and was completed on January 18, 2017.
    - Laboratory analysis for soil sampling is complete.
    - Boeing constructed a fence to prevent access to a 1,200-foot section of the Sage Ranch Loop Trail where sampling results indicate remediation is necessary to address lead concentrations in soil.
    - Boeing released a statement to community members regarding the status of the sampling results, the need for remediation, and the closure and re-routing of a portion of the trail.
    - The Draft Former Rocketdyne-Atomics International Rifle and Pistol Club Shooting Range Investigation Area Data Summary Report and Findings Report was submitted to DTSC on April 11, 2017. DTSC provided comments on the report to Boeing on May 5, 2017. DTSC received responses to DTSC comments on July 11, 2017. DTSC sent a letter dated November 15, 2017 requiring Boeing to conduct further characterization and evaluation of the impacted media that may have entered the Northern Drainage from the Former Shooting Range. DTSC received the Work Plan Addendum for additional field work on February 28, 2018. DTSC provided comments to Boeing on April 13, 2018. DTSC received the Revised Work Plan Addendum and Responses to DTSC comments on May 4, 2018. DTSC approved the Work Plan Addendum with additional requirements in a letter on May 23, 2018. The additional field work was conducted between June 18-20, 2018. Boeing submitted the Revised DSFR on October 15, 2018. DTSC is currently reviewing the report.

        - On September 12, 2017 DTSC and the Los Angeles Regional Water Quality Control Board conducted a site inspection of recently installed storm water best management practices (BMPs) used to control storm water runoff from the Former Shooting Range into the Northern Drainage. Based on the site inspection and recommendations from DTSC and the LARWQCB the BMPs were evaluated by the Expert Panel and subsequently upgraded.
- ***Subarea 1B Southwest -*** Area I Burn Pit, CTL-V, and areas not associated with RFI sites in Subarea 1B Southwest
    - Boeing submitted the RFI Data Summary Report for 1B Southwest in late December 2017. It was received by DTSC on January 2, 2018.
    - DTSC is reviewing the report.
- **Risk Assessment**
    - Risk Assessments were included in the two draft RFI Data Summary and Findings Reports submitted to date (Subareas 5/9 South and 1A Central).
    - Based on DTSC review comments and changes in risk assessment input parameters by the USEPA, the risk assessment process will need to undergo some changes.
        - Boeing submitted a draft risk assessment work plan [draft Standardized Risk Assessment Methodology, Revision 3 (draft SRAM-3)] on May 18, 2017.
        - DTSC sent Boeing a letter on January 16, 2018 rejecting the revised work plan. Boeing contested DTSC's rejection of the draft SRAM-3 in a letter dated March 15, 2018. DTSC responded in a letter dated April 4, 2018 and agreed to calculate the risk for the resident and resident with garden. Boeing further contested items in the April 20, 2018 letter. These letters can be viewed at the following link. Then conceded these items in a letter dated May 21, 2018. Boeing submitted a revised SRAM-3 in July 2018. DTSC is reviewing the revised SRAM-3.
    - DTSC requested 95 UCLs for 5/9 South in May 2018 and 1A Central in June 2018. Boeing provided the 95 UCLs for 5/9 South sites and 95 UCLs for 1A Central sites in July 2018. DTSC responded with a letter requesting additional information for the 5/9 South sites in July 2018. Boeing responded in a letter dated August 28, 2018. DTSC responded with a letter requesting additional information for the 1A Central sites in August 2018. Boeing responded in a letter dated September 11, 2018.

GROUNDWATER:

- Faults
    - In 2016, Boeing submitted draft technical memorandum evaluating faults (main document and appendices) and an update. The concepts presented in the faults technical memorandum have been incorporated into the draft Remedial Investigation Report
    - DTSC is evaluating the faults work within the context of the draft RI Report.

- Groundwater Flow Model
    - Boeing continues to work to update the 3D Groundwater Flow Model.

- Draft Remedial Investigation Report
    - In June of 2017 Boeing submitted a draft RI Report summarizing the results of groundwater characterization work for Area I, Area III and the Southern Buffer Zone. DTSC is reviewing the document.

- Boeing Sites in Area IV
  - In May of 2018 Boeing submitted a draft RI Report summarizing the results of groundwater characterization work for Boeing groundwater sites in Area IV. DTSC is reviewing the document.

- Corrective Measures Studies
  - In September of 2017, Boeing submitted a Work Plan addendum to further explain their approach for conducting Corrective Measures Studies on groundwater and vadose zone bedrock. On June 27, 2018, DTSC sent a letter to Boeing DOE, and NASA requesting more information about cleanup technologies and the development of alternatives to be evaluated in the CMSs.

BUILDING DEMOLITION:

The December 2018 final judgment in the 2013 litigation over the role of DTSC and the Department of Public Health (DPH) in the demolition of Boeing-owned buildings in SSFL Area IV is in the process of appeal by the petitioners, who filed their initial administrative papers on the appeal with the Court on February 27, 2019.

PERMITTING:

In October 2015, Boeing submitted a draft post-closure permit renewal application for the Areas I and III Surface Impoundments and a separate Closure Plan for the Thermal Treatment Facility. DTSC is currently reviewing the Areas I and III Surface Impoundment post-closure permit application for technical adequacy. DTSC has temporarily suspended review of the Closure Plan for the Thermal Treatment Facility pending ongoing discussion of risk assessment requirements.

The post-closure requirements for the Area I and III Surface Impoundments and closure requirements for the Thermal Treatment Facility are regulated by DTSC under RCRA laws and regulations because both are former hazardous waste facilities. The required cleanup levels for the impacted soil and groundwater will continue to be dictated by the 2007 Consent Order.

SITEWIDE GROUNDWATER CHARACTERIZATION AND CLEANUP

The SSFL groundwater characterization and cleanup program is being conducted by the three responsible parties; Boeing, DOE and NASA. The groundwater characterization and cleanup program consists of:

- Investigation and characterization of groundwater contamination;
- Groundwater monitoring;
- Groundwater interim measures; and
- Treatment of contaminated groundwater with permitted discharge from the Groundwater Extraction and Treatment System.

GROUNDWATER REMEDIAL INVESTIGATION (GWRI)

Data gaps were identified in the 2009 GWRI Report by the RPs. DTSC also identified additional data gaps that were presented in the GWRI comments. The data gap work has been divided into six categories:

- Data gaps identified in the Remedial Investigation (RI) Report;
- Source Zone Characterization;
- Characterization of seeps and springs;
- Characterization of faults;
- Groundwater flow model; and
- Contaminant transport modeling.

STATUS OF GWRI DATA GAP WORK

Boeing, DOE and NASA have submitted Draft RFI Reports report summarizing the results groundwater investigations conducted at their respective sites. DTSC is reviewing and issuing comments on the documents. Additionally, Boeing, DOE and NASA are working on a single, overarching site summary document for groundwater characterization at the SSFL site.

Groundwater modeling efforts are proceeding:

- Groundwater flow model
  - The conditionally approved, groundwater flow model work plan presents an approach for a mountain scale groundwater flow model.
    - Work from the fault studies and data from monitoring wells installed since 2009 will be used to supplement the groundwater flow model. DTSC, Boeing, DOE and NASA are considering applying the revised model at the remedy design stage of the project.
- Contaminant transport modeling
  - Boeing, DOE and NASA continue to develop the approach for contaminant transport modeling.

SITEWIDE GROUNDWATER TREATABILITY STUDIES

Treatability studies have been conducted on several technologies to be evaluated in the feasibility study. The treatability studies address both soil/bedrock and groundwater contamination. Treatability studies can be either field studies or laboratory studies.

- Four groundwater laboratory studies were conducted:
  - Chemical oxidation using potassium permanganate;
  - Thermal heating of rock core;
    - DOE submitted a revised white paper study of thermal heating of fractured bedrock to DTSC in September 2017. DTSC reviewed the document and submitted comments on February 7, 2018.
  - Microbial characterization and Bio-Stimulation of rock core, pore water;
    - Boeing submitted the report called *Laboratory Evaluation of Biostimulation to Treat Chlorinated Ethenes in the Chatsworth Formation* and submitted it to DTSC on July 10, 2017.
    - DTSC is reviewing the report.
- Two field studies were conducted:
  - In-situ chemical oxidation (ISCO) using potassium permanganate;
    - Boeing developed a summary report for ISCO and submitted it to DTSC on June 14, 2016.
    - DTSC issued comments to Boeing on June 16, 2017. Boeing provided responses to DTSC comments on August 28, 2017. DTSC reviewed the responses and provided comments on both the responses and the report on February 7, 2018. Boeing provided responses to DTSC comments on June 12, 2018. DTSC is reviewing the responses.
  - Bedrock vapor extraction (BVE);
    - Conducted at NASA's former Bravo test area in late 2014.
    - NASA has submitted the Technical Memorandum: *Results from Bravo Bedrock Vapor Extraction Treatability Study* dated November 2015 to DTSC.
    - DTSC has reviewed and commented on the report.

GROUNDWATER MONITORING

Groundwater monitoring reports are submitted quarterly, with the fourth submittal being an annual report. DTSC reviews the quarterly reports for completeness and compliance but may not issue written comments on the specific quarterly report if significant issues are not present. If compliance issues arise during review of the quarterly groundwater monitoring reports, DTSC directs the Responsible Parties to take action to comply and follows up to ensure compliance is achieved and maintained.

The annual reports present the results of the previous year's monitoring and undergo a more thorough review. Annual Report for DOE, NASA and Boeing groundwater monitoring activities were submitted to DTSC on March 12, February 21 and February 26, 2018 respectively. DTSC is reviewing the Reports.

GROUNDWATER INTERIM MEASURES (GWIM)

The GWIM project includes the operation of fourteen groundwater extraction wells. The water will be pumped to the existing Groundwater Extraction Treatment System (GETS) for treatment. GETS effluent is regulated by the Los Angeles Regional Water Quality Control Board (LARWQCB).

On October 2, 2017, the LARWQCB enrolled Boeing under General Waste Discharge Requirements to regulate injection of GETS effluent to WS-5. Surface discharge of GETS effluent regulated under an NPDES permit can proceed after securing a Streambed Alteration Agreement with the California Department of Fish and Wildlife.

- GWIM and GETS infrastructure is complete, and permits are in place. Operations will begin after baseline groundwater sampling and system commissioning have are complete. Full operations of the is anticipated to start in September.
- As described above, DOE is actively monitoring the slow water level recovery from pumping well RS-54 and Core Hole C-21 at FSDF in Area IV. DOE is handling and disposing of the extracted groundwater as liquid waste.
- Water levels at SP-890, SP881, and SP-882 are being monitored. If seepage occurs, it is mechanically collected. When GWIM operations begin the seeps will be dewatered through operation of extraction well WS-9A.

GROUNDWATER RFI REPORT

Working toward a report format approved by DTSC in January, 2017, Boeing, DOE, and NASA prepared and submitted individual report sections for their specific groundwater characterization activities. The individual report sections were submitted by Boeing on June 2, 2017, DOE on June 15, 2017, and NASA on May 8, 2017. DTSC is reviewing the reports and submitted comments on the DOE section on March 25, 2018. DOE submitted an updated revised report on August 30, 2018, which is currently undergoing DTSC review. The individual sections will be part of single sitewide report deliverable.

FEASIBILITY STUDY / CORRECTIVE MEASURES STUDY

DTSC has conditionally approved the Feasibility Study work plan. Cleanup of sitewide groundwater and surficial media in Boeing areas will be regulated under Chapter 6.5 of Division 20 of the Health and Safety Code (California Hazardous Waste Control Law and the Resource Conservation and Recovery Act authorizations). Soils in DOE and NASA areas will be cleaned up under the respective AOCs, and Soils Remedial Action Implementation Plans (SRAIPs) will be prepared to describe their respective cleanup

activities. DTSC has received, and is reviewing Boeing's, DOE's, and NASA's Corrective Measures Studies Work Plan addenda for groundwater and vadose zone bedrock. On June 27, 2018 DTSC sent a letter to the RPs asking for additional information regarding assessments and criteria to be used in the CMS.

PUBLIC OUTREACH

Since DTSC released the Interim Summary Report of Woolsey Fire Impacts at SSFL & Surrounding Communities Sampling Results on December 18, 2018, Response Team members have been waiting for validation of some of their laboratory data. Once all of their data has been validated and received, DTSC will incorporate the remaining data and issue an updated final report.

During the month of February 2019, DTSC:

- Began discussions about the Bi-Annual Community Meeting and logistics;
- Continued to review comments received regarding the SSFL draft PEIR and draft PMP;
- Continued to review comments received regarding the United States Department of Energy Draft RCRA Closure Plans for the Radioactive Materials Handling Facility (RMHF), the Hazardous Waste Management Facility (HWMF) (Closure Plans) and the supporting DOE Standard Operating Procedure for Demolition of Facilities in Area IV at the Santa Susana Field Laboratory, Revision C, August 2016 (SOP); responded to the public regarding general project inquiries; and
- Uploaded 5 documents to the Document Library on DTSC's website:

Documents submitted in February 2019

1. DOE Report on Annual Groundwater Monitoring, Area IV, 2018
2. NASA Area I LOX and Area II Annual Groundwater Report 2018
3. NASA Workplan for Replacement of GWIM Well ND-138 (revised per DTSC comments)
4. Petitioner's Initial Appeal Documents
5. SSFL Monthly Update - December 2018

SSFL ACTIVITIES ANTICIPATED AFTER FEBRUARY 2019

DTSC

DTSC is compiling comments received on the Draft PEIR and Draft PMP and will generate responses to those comments.

NASA

- DTSC will complete review of NASA's February 2017 revision of the Soil Data Summary Report.
- The current NASA program to remove ancillary infrastructure and buildings at their SSFL sites is currently in its final phase, with completion anticipated by Summer 2019. NASA does not plan to demolish any historic test stand structures as part of their current program. Demolition activities at SSFL are conducted under the clearance permit requirements of Ventura County.

- DTSC will continue to review sections of NASA's May 2017 Remedial Investigation (RI) Report, June 2017 Human Ecological Risk Assessment and February 2018 Sampling and Analysis Plan for groundwater investigations conducted at NASA sites.
- DTSC will review and provide comments on NASA's August 2018 Groundwater CMS Report.

DOE

- DOE will revise and submit the Draft Chemical Data Summary Report.
- DTSC will provide comments to DOE regarding the Draft RCRA RMHF and HWMF Closure Plans.
- DOE and DTSC will continue data evaluation and groundwater discussions.
- DTSC will provide the final set of comments on 2018 DOE RFI Groundwater Report.
- DTSC will complete review of DOE's 2017 and 2018 Annual Groundwater Monitoring Reports (dated March 2018 and 2019).

- DOE will continue GWIM operations, as well as associated data evaluation.
- DTSC will review and provide comments on DOE's September 2018 Draft Corrective Measures Study Report.

BOEING

SURFICIAL MEDIA INVESTIGATION

- Preparation of the RFI summary reports and Risk Assessments is ongoing for all Boeing sites and subareas. RFI summary reports and risk assessments are being submitted separately. Boeing has submitted all nine Data Summary and Findings Reports for Areas I and III. DTSC anticipates continuing to review the RFI DSFRs in March 2019.
- DTSC is reviewing the Subarea 10, 5/9 North, 1A South, 1B Southeast, 1B North, 1A North, and 1B Southwest RFI DSFRs.
- DTSC is reviewing responses to comments on the Final Report of Results on the ISCO Field Experiment.
- DTSC is reviewing the report on Laboratory Evaluation of Biostimulation to Treat Chlorinated Ethenes in the Chatsworth Formation.
- DTSC is reviewing the Revised SRAM-3 submitted in July 2018.
- DTSC is reviewing the Shooting Range DSFR submitted in October 2018.

GROUNDWATER

- Faults
  - DTSC is evaluating the concepts presented in the faults technical memorandum within the context of the draft RI Report.
- Boeing groundwater characterization work in Area IV
  - DTSC is reviewing the draft report submitted in May 2018.
- Groundwater flow model.
  - The groundwater flow model continues to be developed.
- Groundwater Report.
  - DTSC is reviewing the Boeing section of the site-wide Groundwater RFI Report submitted in June 2017.

STORMWATER MONITORING AND SAMPLING

- To comply with Los Angeles Regional Water Quality Control Board requirements, Boeing will monitor flow and collect samples as needed during rain events.

FEASIBILITY STUDY / CORRECTIVE MEASURES STUDY (CMS)

- DTSC is reviewing the CMS reports submitted by DOE and NASA.

SITEWIDE GROUNDWATER

DTSC is reviewing and commenting on the individual report sections for Boeing's, DOE's and NASA's specific groundwater characterization activities. The individual sections are intended to be part of single sitewide report deliverable that is under development.

PUBLIC OUTREACH

The following Public Participation activities are anticipated in the next 30 days:

- The DTSC SSFL Monthly Update Report for February will be posted online and added to the "What's New" page;
- Review and responses to public comments on the draft PEIR and draft PMP will continue;
- Review and responses to public comments on the Draft Closure Plans will continue;
- and
- Revisions to the Public Participation Plan will include the outreach process for the draft PEIR and draft PMP, the April bi-annual meeting, and the draft Closure Plans, next steps, and the outreach strategy moving forward.

GENERAL PROJECT SCHEDULE

The current schedule goal is to finalize the PEIR in 2019. When site characterization documents are completed, the next step would be for all three RPs to develop their respective draft cleanup decision documents. Cleanup activities would begin after the cleanup decision documents are made available for public comment, the comments appropriately addressed, and the cleanup decision document finalized.

The departure from the 2017 schedule presented in the Consent Order and referred to in the AOCs is due to the recognized complexity of the project, including the rugged physical nature of the site, multiple responsible parties, and the need to complete several phases of investigation to define the nature and extent of impacted soils. In addition, as described in Section 4.3 (of the Program Management Plan), during the investigation phases, several cleanup actions were taken.

Project cleanup schedules will be further defined in the remediation planning documents and associated designs. The schedules will be provided in the updated Program Management Plan. The cleanup of all chemically and radiologically impacted soils is currently anticipated to take approximately 15 years to completed.

2 PROJECT OVERVIEW

The SSFL is located 30 miles northwest of downtown Los Angeles in southeastern Ventura County, near the crest of the Simi Hills at the western border of the San Fernando Valley. A former rocket engine test and nuclear research facility, the 2,849-acre field laboratory is currently the focus of a comprehensive environmental investigation and cleanup program, conducted by Boeing, DOE and NASA, and overseen by DTSC.

Boeing owns and operates Area I, except for the approximately 41-acre former Liquid Oxygen (LOX) Plant area, and all of Areas III and IV. Areas I and III are operated by Boeing. Boeing also owns the

approximately 1,143-acre southern buffer zone and 182-acre NBZ. NASA is responsible for cleanup and administration of Area II and the former LOX Plant, but it is owned by the federal government. Boeing owns and operates Area IV but DOE is responsible for cleanup of soils in Area IV and the NBZ

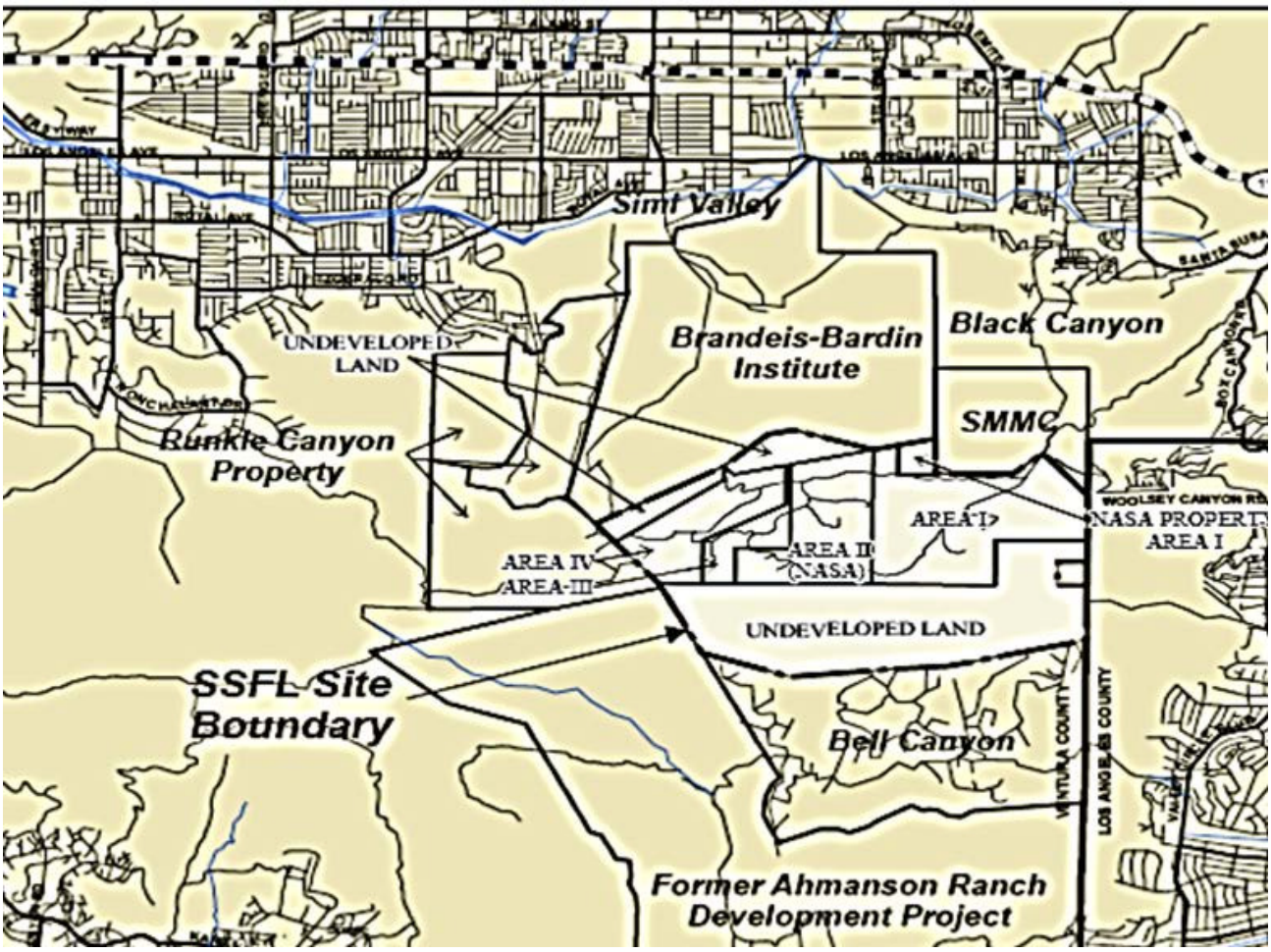

Figure 1 – SSFL and Surrounding Area

DOE

DTSC and DOE participated in chemical soil sampling efforts in Area IV of the SSFL property where former DOE activities occurred on the Site. Area IV is a 290-acre area located in the northwestern

section of the site. DOE owns facilities on a 90-acre site within Area IV. Area IV includes the Energy Technology Engineering Center (ETEC) facility where nuclear research, development, and testing began in the 1950's.

The Area IV radiological soil sampling effort, conducted by the US EPA, was completed in 2012. The US EPA approached the investigation by splitting the Area IV and NBZ investigation into historical site assessment (HSA) subareas. The chemical soil sampling efforts followed the same HSA subarea designations. DOE and DTSC participated in Area IV and NBZ co-located soil sampling for chemical contaminants.

DOE completed the chemical soil characterization sampling in 2014. The sampling included three phases, as specified in the December 2010 AOC, signed by DTSC and DOE:

- Phase 1 - co-located sampling for chemical analysis at US EPA's first phase of radiological sampling locations in Area IV and the NBZ.
- Phase 2 - sampling at randomly selected sampling locations, and
- Phase 3 - identify the locations at the Site where insufficient chemical data exists (chemical data gaps) and sample as appropriate.

In 2012, the US EPA, in coordination with DTSC and DOE, completed its second round of sampling efforts to define the nature and extent of radiologic contamination in Area IV.

US EPA's round two sampling locations were based upon the validated sampling results they received from their Round 1 sampling.

Not all of US EPA's Round 2 sample locations were sampled for chemical contaminants in 2012 and chemical data gap investigation locations may have been required where no radiological sampling was needed. In 2013-2014, the rationale and selection of chemical data gap investigation sampling locations for Area IV were provided, discussed with the community, and implemented. The Area IV chemical data gap sampling is now complete. The radionuclide and chemical results from these investigations are being used for remediation planning. A Draft Chemical Data Summary Report was submitted to DTSC on December 29, 2016. DOE Draft Environmental Impact Statement was issued to the public on January 6, 2017.

DOE has completed investigations of groundwater source areas at DOE sites in Area IV, with the goal of characterizing the nature and extent of contaminant releases at these areas for groundwater remedial planning. DOE's findings were presented in a site-wide RCRA Facility Investigation Report.

NASA

NASA has concluded chemical data gap investigations of soil and surficial media characterization at the 41.7-acre NASA administered portion of Area I (the former LOX Plant), and 404-acre Area II. NASA Area II was used primarily for rocket engine testing and includes the Alfa, Bravo, Coca, former Delta Test Stands and support structures. Under the terms of the December 2010 AOC, NASA implemented six Field Sampling Plans (FSPs) to complete the AOC soil investigations.

The five NASA surficial media FSPs include:

- FSP-1 - Alfa-Bravo Fuel Farm, Coca-Delta Fuel Farm, Propellant Load Facility
- FSP-2 - Incinerator/Ash Pile/STP, Building 204, Storable Propellant Area (SPA), and Skyline Road
- FSP-3 - Alfa Test Stand, Bravo Test Stand
- FSP-4 - LOX Plant, Area II Landfill, ELV
- FSP-5 - Coca Test Stand, former Delta Stand, R2 Ponds

The sampling proposed in the FSPs is complete, and DTSC is reviewing NASA's draft Data Summary Report for soils characterization work in the NASA areas of the site.

NASA is conducting extensive investigations of five major groundwater source areas at Area I LOX Plant and Area II, with the goal of characterizing the nature and extent of contaminant releases at these areas for groundwater remedial planning.

BOEING

Boeing owns most of Area I and all of Areas III and IV. Areas I and Ill total 792 acres and are operated by Boeing. Boeing also owns the 1,143-acre southern buffer zone and 182-acre NBZ. Soils in Area IV and the NBZ are being characterized in the DOE portion of the project.
Boeing sites are in Reporting Groups 1A, 1B, 5, 9 and 10. Boeing has reorganized the sites in subgroups identified as Boeing RFI Groups:

- 1A North, 1A Central, 1A South
- 1B North, 1B Southwest, 1B Southeast
- 5/9 North, 5/9 South, and
- Group 10

The proposed sampling is substantially complete, and Boeing has begun submitting data summary reports for DTSC review. Boeing is conducting investigations of groundwater source areas at Boeing sites in Area I and Area III, with the goal of characterizing the nature and extent of contaminant releases at these areas for groundwater remedial planning. Additional Information can be found on DTSC's website at: www.dtsc.ca.gov/SiteCleanup/Santa_Susana_Field_Lab